RIBAK, Charles E. and Lynn ANDERSON* Department of Anatomy, University of California, Irvine, California; and Division of Neurosciences City of Hope National Medical Center, Duarte, California. The ultrastructure of pyramidal basket cells in the rat dentate gyrus.

Pyramidal basket cells in the dentate gyrus of the hippocampus have been previously described in Golgi studies. These cells have their somata either embedded into or located directly beneath the lower part of the granule cell layer. The axons of pyramidal basket cells form basket endings with granule cell somata. In our previous immunocytochemical study of the hippocampus (Ribak, Vaughn and Saito, Brain Research, 140 1978) glutamic acid decarboxylase, the synthesizing enzyme for the neurotransmitter GABA, was localized to the somata and axon terminals of these pyramidal basket cells in light microscopic preparations. The results of the present ultrastructural analysis show that the morphology of these cells differs in many ways from that of the granule cells, besides the obvious difference of their larger somal size. Pyramidal basket cells display infolded nuclei and intranuclear rods and sheets, characteristics that are not found in granule cells. The results from silver-stained light microscopic preparations confirmed the pres-ence of intranuclear rods within these cells and their absence in granule cells. The pyramidal basket cells also show a greater abundance of cisternae of granular endoplasmic reticulum and other perikaryal organelles. Furthermore, the somata and smooth dendrites of these cells form a mixture of symmetric and asymmetric synaptic junctions with contacting axon terminals. These ultrastructural characteristics of the pyramidal basket cells are quite similar to those for the GABA-ergic neurons in the cerebral cortex, the aspinous stellate cells. It is suggested that some of these characteristics may underlie the role played by pyramidal basket cells in providing GABA-mediated, tonic inhibition of neurons in the hippocampal dentate gyrus.

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